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SUMMER ISSUE

SEPTEMBER, 1957

## PRESIDENT'S MESSAGE

by ANDREW W. NEUREUTHER, President

Registration of qualified engineers should be encouraged by I.S.P.E. members.

All of the State societies and N.S.P.E. regularly promote registration of engineers. Over the years they have sponsored registration laws, and have worked diligently

for the passage of registration laws in most of the States, endeavoring to make them fair, equitable, and workable.

They have continuously urged engineers to register after the registration laws were in effect. They have helped to register engineers by furnishing pertinent information and organizing refresher courses to better prepare prospective registrants for the required examinations.

I.S.P.E. has done a good job of organizing refresher courses in the past. It will continue to do so in the future; and right now several are starting during the month of September. I.S.P.E. has published typical examination questions from both the professional engineers' and the structural engineers' examinations. Recently, revised professional engineers' questions were published, and just now a new book of structural examination questions has been made available.

Why all the nationwide emphasis on registration? And why do engineers seem to be both diligent about registration, and dilatory about it?

Those who are dilatory must be uninformed about registration. While there are many subprofessional engineers who are not yet qualified to register, there are many well qualified and informed engineers who do not attempt to register. These men must fail to realize the import of registration in modern society. They seem to feel that they will not register as long as they are not REQUIRED to register, either legally or as a condition of their present employment. Others just never get around to doing it.

Yet every qualified engineer who does not consciously take steps to register as soon as possible is missing an opportunity to gain status, prestige, recognition, and additional compensation which will accompany this added mark of competence, and the highest obtainable reputa-

tion. He simply is failing to keep up with the times.

Over the years, viewpoints of engineering have changed. In earlier times engineers like Leonardo da Vinci needed no registration. Twenty years ago a B.S. degree was the mark of a qualified engineer. After a few years of experience his qualifications were never questioned. There was no additional standard of competence to meet. Now a B.S. degree is merely the mark of an EIT or a subprofessional on the way to becoming a registered professional engineer.

As time passes standards are raised. We have all seen improvements in our standard of living through improvements in methods, materials, products, and skills. We all now have higher standards about the mere necessities of life such as our food, clothing, shelter, medical care, and education.

Consider employment. Many years ago any able-bodied man could get most any job. Before too long there was a specification that he "must be able to read and write." In addition to this, today many ads now specify, "must have car." Similarly, many ads for engineers now read, "must be registered." And the number of such ads is increasing.

But whether it is specified or not, the value of registration has become fixed in the minds of the public. Employers are influenced in selection and promotion of engineers. Clients are influenced when they place a commission for engineering.

Other engineers are influenced by the competence indicated by registration. Only registered professional engineers may offer their services to the public. And as a practical matter, no longer can anyone but a registered professional engineer serve as an expert witness in court, since an opposing attorney very easily discredits any expert technical witness who is not registered.

The qualified but unregistered engineer has definitely limited himself. So keep abreast of the times. Register if you have not yet registered. And encourage all qualified engineers to register. Spread the word about registration procedures and dates. Help to organize refresher courses where needed. Improve the engineering profession by your contributions of service toward registration.

### SUBSCRIPTION RATES

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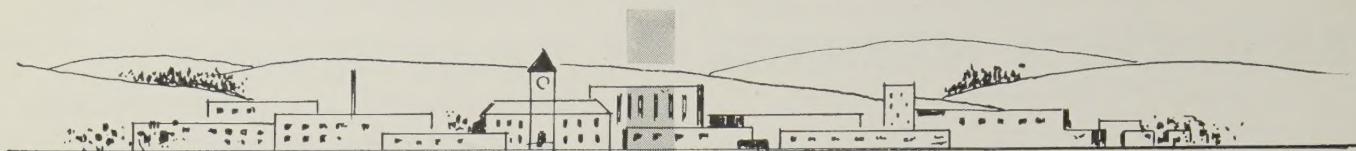
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The Illinois Society is not responsible for statements made or opinions expressed in this publication.

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# How would you save a failing sewer in quicksand, 42 feet underground?



Yes, it was a tough question. But Armco Liner Plates provided an easy answer. Here's the chain of events:

In Owensboro, Kentucky, an 84-inch-diameter rigid pipe trunk line, carrying sanitary and storm sewage, began to fail. It had been tunneled through quicksand, and now was developing large cracks that admitted highly fluid sand. To complicate the problem, the sewer was 42 feet underground and any repair had to be made while the sewer was in operation.

The project was opened to competitive bidding. Here's how the successful contractor did the job with the help of Armco Liner Plates. The pre-curved, corrugated metal Armco Liner Plate sections were taken

into the failing sewer and bolted together from the inside to make an integral lining structure. No space was wasted. And the offset-lapped joints of Armco Plates provided extra strength.

For this sewer lining job, the Armco Liner Plate structure was 72 inches in diameter. The 10-gage plates were bituminous coated.

For more data on Armco Liner Plates, write us.

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**RIGHT:** Worker is attaching another Armco Liner Plate. Note water flowing during installation and the absence of waste space between the old and new structures.

**BELOW:** The completed Armco Liner Plate structure being inspected after a siege of high water. Note perfect alignment and high water marks.



**ARMCO**



**LINER PLATES**

# VOX SECRETARII

By P. E. ROBERTS, *Executive Secretary*

## Membership

In the July 1956 issue it was reported that the total number belonging to the Illinois Society was 1920 on June 15. On June 15, 1957 membership totals reached 1978, and the long sought 2,000 total has not yet been reached. Present indications, however, point toward the successful completion of the Society's first membership hurdle. A "trial balloon" sent out in July is producing some encouraging results. The point in telling you this, however, is that you and all others who read this can be of much help in inviting registered engineer non-members to become members of the Illinois Society. An invitation went to each registered engineer of the State of Illinois who is not now a member. Your help is needed in this final quarter of 1957.

## 73rd Annual Meeting

The Organization Committee in charge of the planning and conduct of the 73rd Annual Meeting of the Illinois Society, which will be held in Decatur on April 10, 11 and 12, 1958, met the last week in August. The Society last met in Decatur at the 65th Annual Meeting in 1950. President Neureuther was General Chairman of the 1950 Annual Meeting Committee. John R. Castle General Chairman of the 73rd Annual Meeting.

## Miscellany

Registration recognition dinners will be held by several Chapters honoring those who are newly registered. There has been some discussion between the officers of three or four downstate Chapters to hold a combined dinner . . . One Structural and six Professional refresher course classes are under way . . . Need applications for membership — "GET TWO" . . .

## GEOGRAPHICAL DISTRIBUTION OF THOSE PASSING THE PROFESSIONAL ENGINEERING EXAMINATION

The spring Professional Engineering examination was given by the Examining Committee of the Department of Registration and Education on May 7th and 8th, 1957. One hundred and ninety-two passed the examination and were registered. The geographical distribution of those passing by Chapters of the Illinois Society are as follows:

Capital (Springfield)	5	Madison (Alton)	4
Central Illinois (Decatur)	7	Peoria (Peoria)	18
Champaign (Champaign)	6	Rockford (Rockford)	8
Chicago (Chicago)	108	Rock River (Dixon)	2
DuKane (Aurora)	11	West Central (Galesburg,	
Illinois Valley (Ottawa)	3	Kewanee & Rock Island	4
Joliet (Joliet)	1	Out of State	5
Lake (Waukegan)	10		
		Total	192

*Better Nature:* One thing our alarm clock never arouses.—*In a Nutshell.*

## SILVER ANNIVERSARY OF AGRICULTURAL ENGINEERING AT THE UNIVERSITY OF ILLINOIS TO BE OBSERVED HOMECOMING WEEK END

Agricultural Engineers from Illinois will gather at Urbana on October 18 and 19, Homecoming Week End, to observe the 25th Anniversary of the Professional Curriculum in Agricultural Engineering in the College of Engineering of the University of Illinois. In the fall of 1932 the old Farm Mechanics Department of the College of Agriculture was officially named the Department of Agricultural Engineering and the curriculum leading to a Bachelor of Science in the College of Engineering was first put into effect.

Friday evening, October 18, an anniversary dinner will be held in the Illini Union Ballroom. Here alumni, faculty past and present, other agricultural engineers, other friends and their wives will gather to share experiences and fun, answer a roll call of classes, and hear the President of the American Society of Agricultural Engineers, Mr. Earl Anderson, Agricultural Engineer of Stran-Steel Corporation, Detroit, guest speaker.

Saturday the Department is holding an Open House for the guests and any others who may be interested. Other engineers and scientists are especially welcome. The laboratories and classrooms of the Department will open with displays depicting research and teaching activities in which engineering applications have brought about great advancements in Illinois agriculture the past 25 years and promise even greater developments in the future. Lunch will be served by the Student Branch for the convenience of the out-of-town guests. A special block of seats for the Illinois-Minnesota football game on Saturday afternoon has been reserved for the agricultural engineers who order them by September 15.

Tickets for the banquet should be ordered directly from the Department of Agricultural Engineering and football tickets should be ordered from the Athletic Office with the request that they be in the section for the agricultural engineers.

Dr. Frank B. Lanham, Head of the Department, is an active member of ISPE. Other members of the department staff and a number of the graduates are also members.

America is the only country in the world where a man can fill a three-car garage with automobiles which he doesn't own.

—O. A. Battista.

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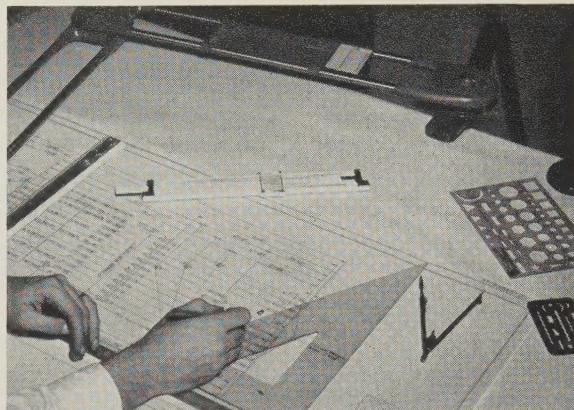
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## Typical Structural Examination Questions

D6. Figure D6 shows diagrammatically a proposed combined footing to support a wall column and an intermediate column.

Assume that the maximum permissible soil pressure is 6,000 lbs. per sq. ft., *exclusive of the weight of the footing and distributing girders*, and:

- Determine the distance  $x$  and the length of the grillage beams to secure uniform soil pressure over the entire bearing area.
- Draw the shear and moment diagrams for a width of one foot of the grillage.
- Draw the shear and moment diagrams for the distributing girders acting together as a unit.

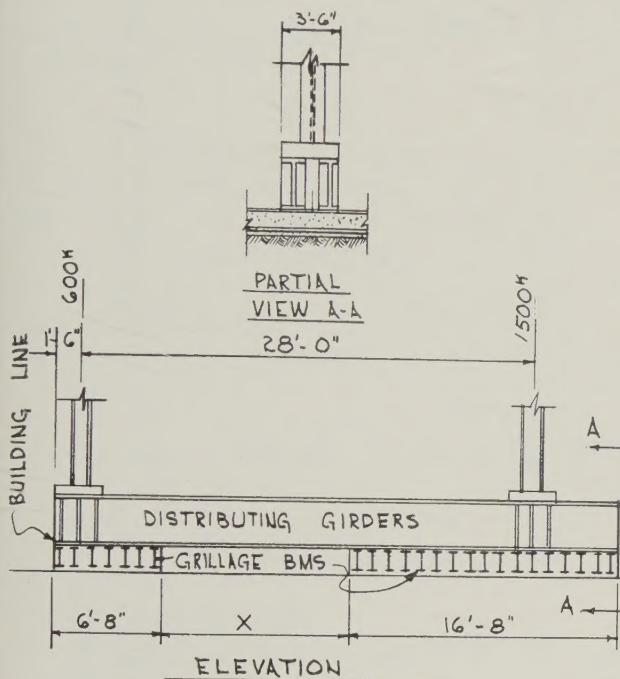


Fig. D-6

D7. Assume that your client has been notified to post safe loading cards in one of his buildings and that the plans for the building are missing. Upon making an inspection you find that the building consists of a number of 12 ft. x 12 ft. bays. The construction is entirely of wood. The floor is 2 inch dressed and matched flooring supported on 6" x 10" beams at 4 ft. centers. The ends of these beams are carried by 12" x 12" timbers spanning between 8" x 8" posts with a clear height of 14'. Using Chicago Building Code what is the safe load that should be posted. Use net dimensions of timbers and show all work instead of taking values from tables except as a check.

D10. For the construction shown in Fig. D10, and a live load of 150 lbs. per sq. ft.

- Determine plank thickness.
- Thickness and spacing of joists.
- Depth of beams.

Maximum tension—1600 lbs. per sq. in.

Maximum Hor. Shear—120 lbs. per sq. in.

Base your calculations on finished size.

D11. The reinforced brick masonry pier shown in Fig. D11 carries a load which when combined with the dead load of the pier exerts a pressure of 4000 lbs. per sq. ft. on the foundation material.

Is the design adequate for the superimposed load if constructed of brick whose maximum value of  $f'_{b}$  is 1200 lbs. per sq. in.? Follow Chicago Building Code in checking the Design.

D8. Fig. D8. Assuming that total vertical load at bottom of concrete footing is 1,550,000 lbs., and maximum wind velocity of 100 m.p.h., calculate maximum and minimum pressures under footing. What must be the minimum allowable bearing capacity of soil in order that the smoke stack will be safe against overturning?

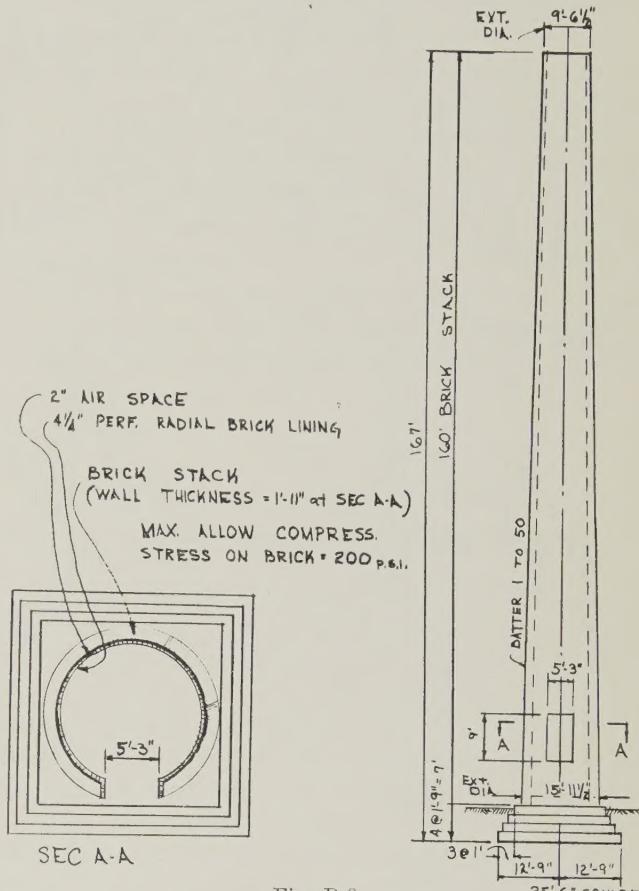


Fig. D-8

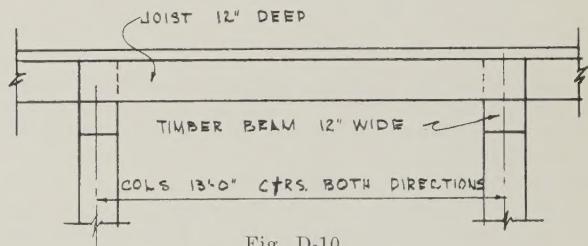


Fig. D-10

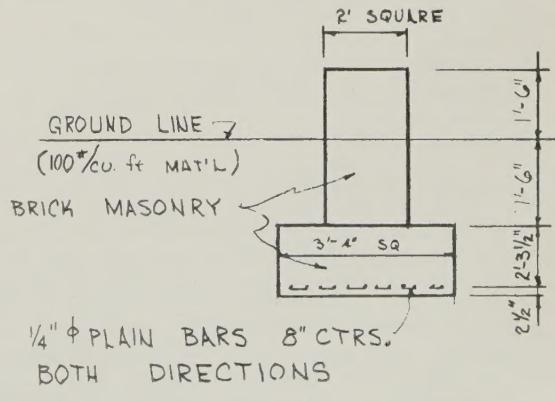


Fig. D-11

D9. Fig. D9. Indicates a sand dryer building along a river bank where high water may last for several days and completely saturate the ground below high water level adjacent to and below the building. Assume that the sand and gravel are entirely pervious so that hydrostatic pressure exists in addition to the horizontal pressure resulting from earth.

FLOOR IS OF LIGHT CONSTRUCTION  
AND ASSUME NOT TO OFFER ANY  
HORIZONTAL RESTRAINT AT TOP  
OF WALLS.

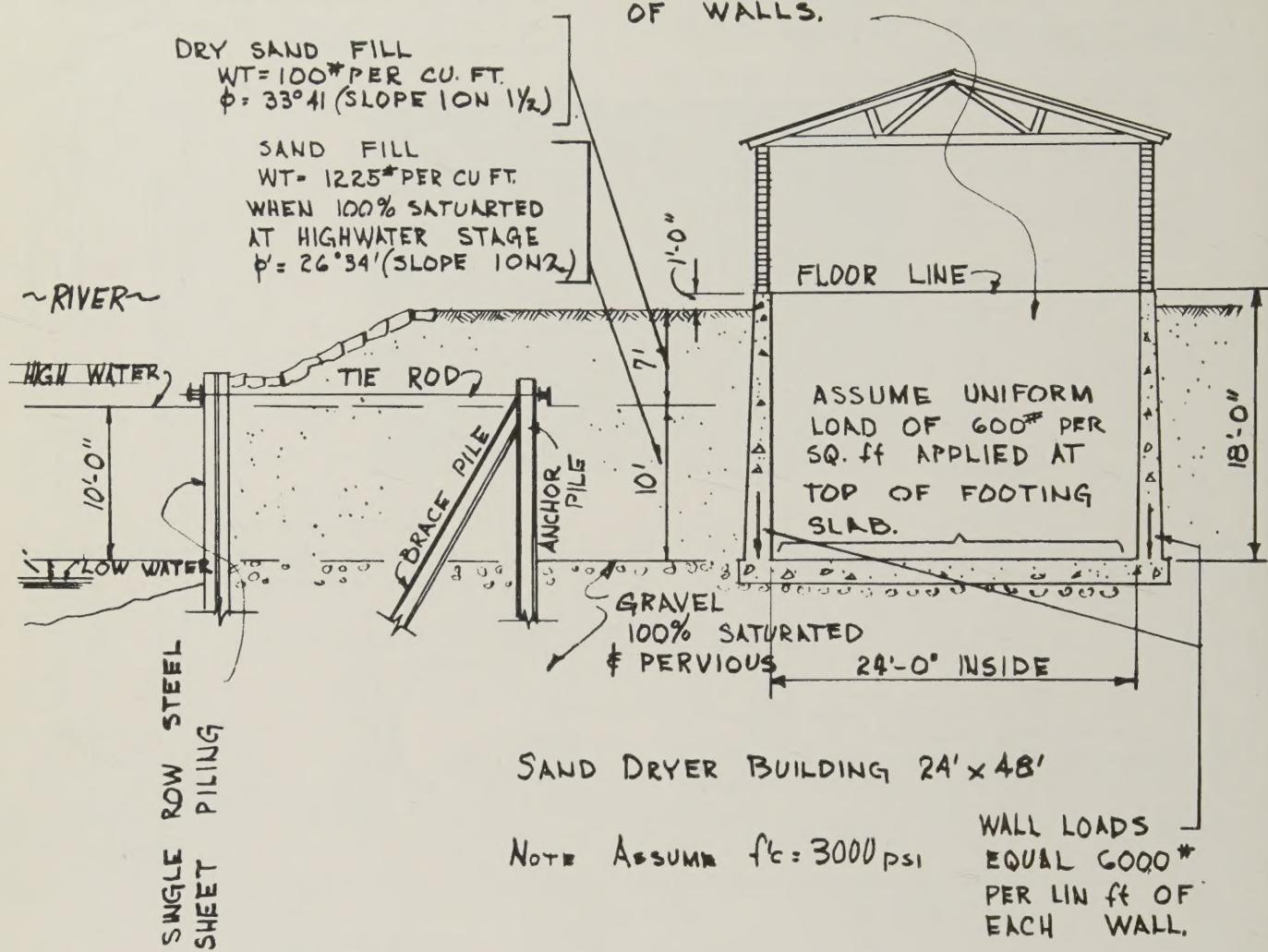


Fig. D-9

D12. Assume the girder in Fig. D12 to be braced laterally by the floor system. Timber is No. 1 Structural Longleaf Southern Pine.

- Is the girder adequate in design?
- Is the column adequate in design?
- What changes in section, if any, would you recommend?

D14. Give in your opinion the conditions under which you would use the following types of foundation:

- Caissons to rock
- Caissons to hardpan or similar stratum
- Precast or cast in place concrete piles
- Steel H. piles
- Natural soil.

D15. Assume that due to property line limitations the outside row of columns and the first inside row must be carried on a joint foundation. Assume that the center line of the outer column row is 2 ft. 6 in. from property line and the inner row is 25 ft. from the outer row. The loads of the columns of the two rows are 800K and 1000K respectively. Assume that a pile foundation is required. Design an economical foundation. (You may neglect dead weight of footing and do not design reinforcements). Explain reasons for your selection of type of pile and its loading. Make a neat sketch of foundation.

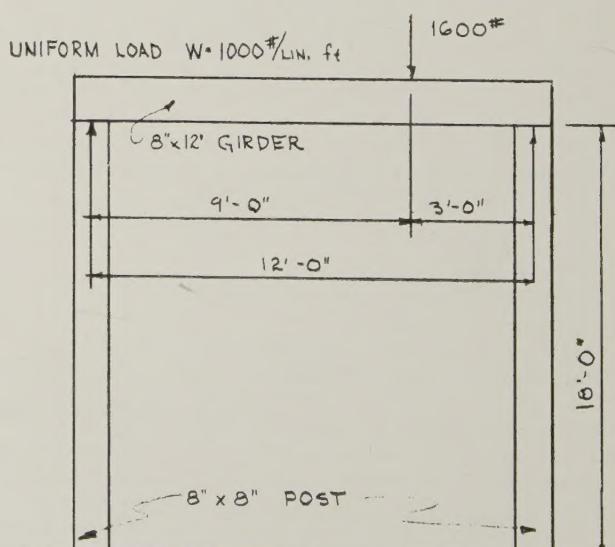


Fig. D-12

# N.S.P.E. 1956 SALARY SURVEY

Young engineers, chemical engineers, and engineers in education have achieved the largest gains in total earnings over the period 1952-56, and engineers employed by Federal agencies have made the smallest gains.

These are some of the findings drawn from the latest "Professional Engineers' Income and Salary Survey" published by the National Society of Professional Engineers.

The Survey, third in a series started by the National Society in 1952, is based on an analysis of 17,000 questionnaires returned from registered professional engineers in all the technical branches.

The Survey shows an increase of 21 per cent in the median earnings of engineers during 1952-56, as indicated on the questionnaires returned. The median salary and income figure for the engineers responding in 1956 was \$9,490, as compared with \$7,850 in 1952.

The competition among employers for recently graduated engineers is reflected in the percentage increase in earnings for this group. Engineers at grade 3, a pre-professional level, were found to have had an increase in earnings of 28 per cent from 1952-56, a higher increase than was noted in any of the other grades.

Chemical engineers had a median earning total of \$11,000 for 1956. Civil engineers had the lowest median earnings of any of the major branches with a figure of \$8,750. Other median earning figures for 1956 were: electrical \$9,460; mechanical \$9,780; mining and metallurgical, \$10,000.

The greatest increase in earnings, dollarwise, was reported by engineers connected with educational institutions, with those engaged primarily in teaching reporting the greatest percentagewise increase. Engineers in public utilities reported the second highest dollarwise increase, while engineers in industry reported the third highest.

For all groups except state government employees, greater increases were obtained between 1954 and 1956 than over the preceding two-year period.

Engineers employed by the Federal agencies showed an earnings increase on the Survey of 12 per cent from 1952 to 1956. This increase trailed well behind percentage increases for the same period in industry, public utilities, education, state government, and county or municipal government.

A statistical breakdown on over-all earnings of engineers in 1956 shows that 90 per cent of those replying to the Survey questionnaire earned at least \$6,390, as compared to a figure of \$5,570 for 90 per cent in 1954. The 1956 Survey also shows that 10 per cent of those replying earned at least \$19,860. In between these two groups, the 1956 Survey shows 75 per cent of the respondents earning at least \$7,510; 50 per cent earning at least \$9,490; and 25 per cent earning at least \$12,840.

On a regional basis, the 1956 Survey showed engineers in the East Coast states enjoying the highest median earnings. However, a comparison of the 1956 and 1952 Surveys indicates a narrowing of the regional gap in median earnings. In 1952 the median income of East Coast respondents was \$1,130 higher than in the South, and \$1,400 higher than on the West Coast; in 1956, the East Coast was still highest, but the difference had come down to \$880 and \$1,160 respectively.

All respondents to the Survey are members of the National Society of Professional Engineers, and thus are registered under the laws of the states and territories to practice as professional engineers. The biennial Surveys are a part of a long-range income and salary study program for the engineering profession undertaken by the National Society.

Copies of the 1956 "Professional Engineers Income and Salary Survey" may be obtained for \$1 from the National Society headquarters, 2029 K Street, Northwest, Washington 6, D. C.

## RESULTS OF CONSTITUTIONAL AMENDMENTS VOTE

The July issue of the *Illinois Engineer* contained a ballot with two proposed Constitutional amendments. The first proposal, amending Article VI—Dues, received 254 "yes" votes and 104 "no" votes. The vote on the Functional Sections proposal was 303 "yes" and 55 "no". A total of 384 ballots were received, 25 of which were invalid, that is, sent in by non-corporate members.

The closeness of the decision on the dues vote is another indication of the wisdom of the writers of the Illinois Society Constitution. The provision requiring that a Constitutional Amendment must have affirmative votes of two-thirds of the total of the number of votes cast to be adopted was written to discourage a small organized minority from making changes in the Constitution.

While the increase in dues will go to the Chapters, it should be noted that this is the first increase in Illinois Society dues since 1947. The National Society dues increased from \$7.00 to \$10.00 per year in 1954. The next increase prior to that was in 1947 when the State member dues were raised from \$5.00 to \$10.00 and National member dues were raised from \$9.00 to \$17.00.

The proposal to change Article XII—Functional Sections, was made in the attempt to avoid any increase in the number of members of the Board of Direction. It was the feeling of the Constitutional Amendments Committee that Functional Sections should have a voice at the Board level and to accomplish this it was thought advisable to have each Functional Section group designate a member of the Board of Direction to speak for them and represent them in matters of interest to that Functional Section.

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## ILLINOIS ENGINEERING COUNCIL

### Final Report of the Legislative Committee Relative to the 1957 Legislative Session

Governor Stratton has approved all Bills, in which the Profession has an interest, passed in this session of the Legislature. These Bills became law effective on the dates of approval, which are as follows:

Bill Number	Subject	Effective Date
S.B. 396	Architects	July 11
S.B. 634	City Engineer	July 8
H.B. 89	Contractor's Bills (Anti-Hodge)	July 11
H.B. 868-876	Bond Issues	July 8
H.B. 913-921	Surveyors	July 8
H.B. 794	License Renewal—Architects	July 8
H.B. 797	License Renewal—Prof. Engrs.	July 8
H.B. 798	License Renewal—Struct. Engrs.	July 8

L. M. SPURLING, Chairman  
Legislative Committee

## HIGHER EDUCATION COMMISSION APPOINTED

The State of Illinois Seventieth General Assembly approved a Bill which created a commission to "analyze the present and future aims, needs and requirements of higher education in the State of Illinois." The commission is also charged with a study of the means and methods of financing the operational and physical plant requirements of higher education. The commission is a permanent one and is to submit a report on or before the first Monday of February each year. The nine men appointed and their terms are as follows:

For term ending in 1959:

Lenox R. Lohr, Museum of Science and Industry, Chicago

Otto Steffy, President Illinois Agriculture Association, Stronghurst

Paul Grigsby, Superintendent, Granite City High School, Granite City

For term ending 1961:

Richard Stengel, Attorney, Rock Island

Walter E. Hanson, Civil Engineer, Springfield

Fred W. Heitmann, Banker, Glenview

For term ending 1963:

Wm. McKnight, Jr., Publishing Executive, Bloomington

Del Rutherford, President, Mt. Vernon School Board

Walter McLaughlin, former member University of Illinois Board of Trustees, Decatur

It is pleasant to note that an engineer was named to this distinguished group. Walter Hanson is a member of the Illinois and National Societies of Professional Engineers and is presently serving as Secretary-Treasurer of the Illinois Engineering Council.

Man blames fate for other accidents but feels personally responsible when he makes a hole in one.—*Blazes.*

## OF INTEREST TO LAND SURVEYORS

The Society of Professional Land Surveyors, Inc., 184 W. Washington Street, Chicago 2, Illinois, has recently published a schedule of recommended minimum fees for land surveying services in the metropolitan Chicago area. The schedule includes fees for Residential property, Subdivisions, Commercial, Industrial, Acreage, and Miscellaneous. The Fees schedule became effective July 1, 1957.

I hold every man a debtor to his profession; from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends to be a help and ornament thereunto.

Sir Francis Bacon

A truck driver, hauling clay for a fill, backed his truck too far over the dump grade. The weight of the load being dumped lifted the front end of the truck several feet off the ground.

"Now, what are you going to do?" an associate asked.

The driver eased out of the cab to contemplate his plight. "Well," he said, "I think I'll grease it—I'll never get a better chance."—True

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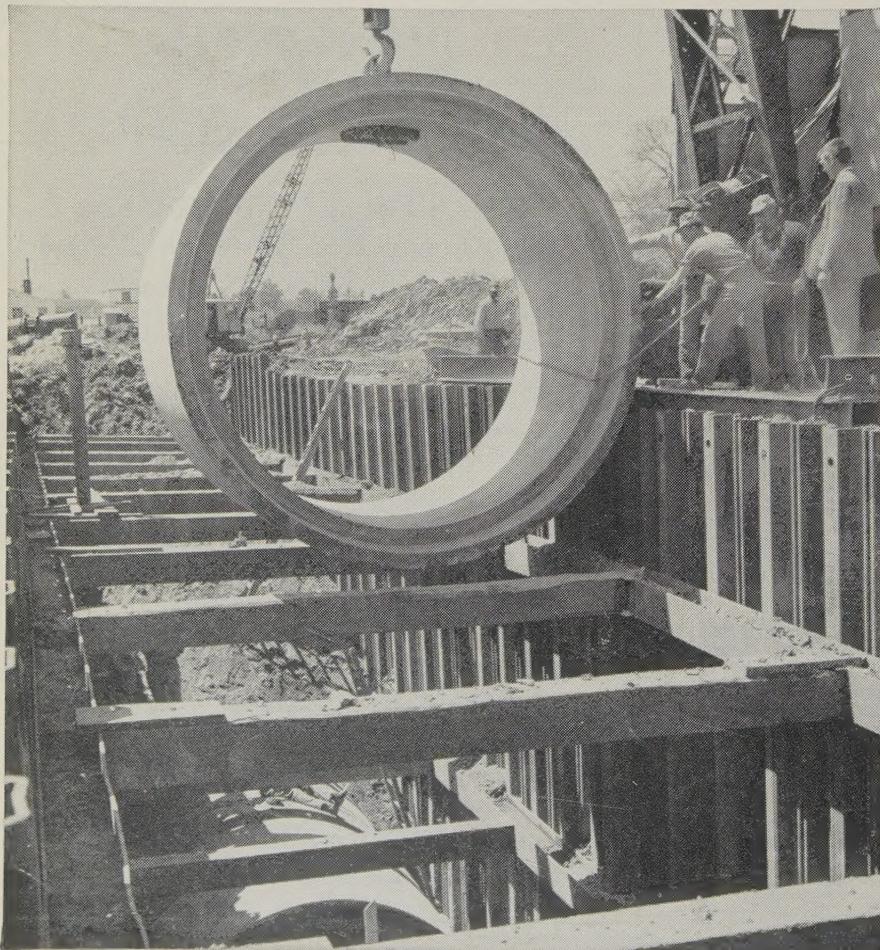
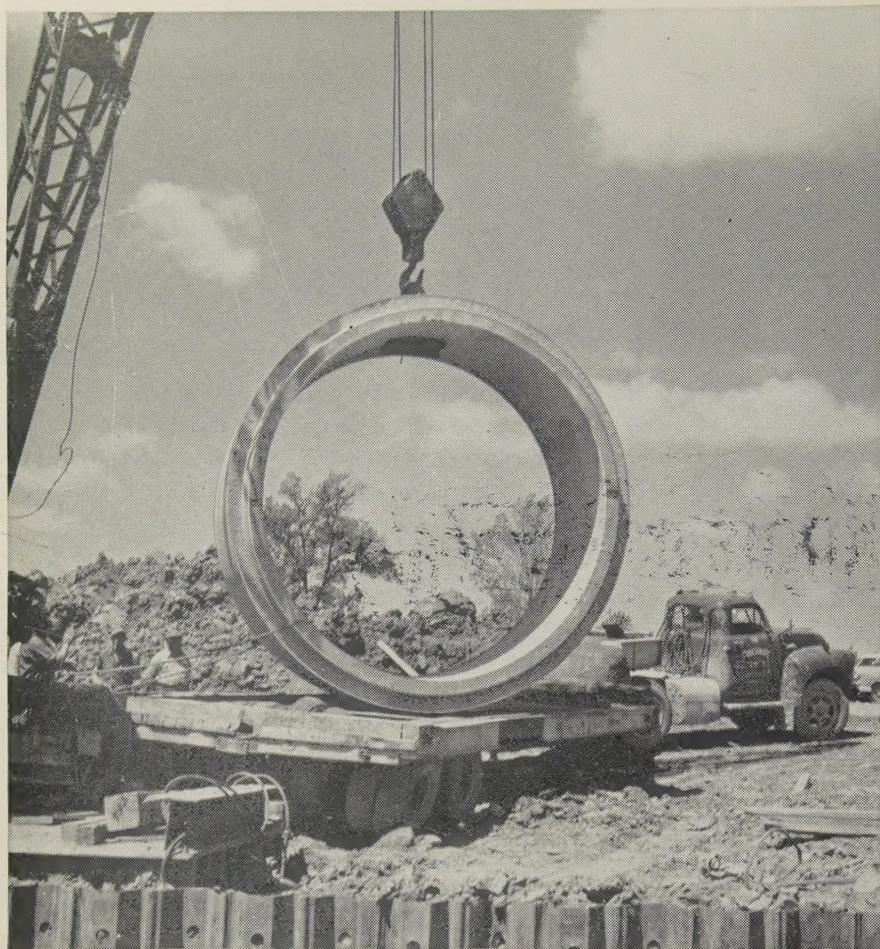
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CONCRETE PIPE**

The Louisville and Jefferson County Metropolitan Sewer District is spending \$1 1/3 million to improve sewer service in Louisville, Ky. Its new combination storm and sanitary sewer includes some of the largest concrete pipe ever placed in the city. This 11-ft. diameter pipe (see photos), manufactured in 6-ft. lengths, has a shell thickness of 12 in. The project required 700 ft. of this pipe.

In addition, there are 200 ft. of 11-ft. diameter pipe cast monolithically on curves, 1657 ft. of precast 8-ft. pipe, 87 ft. of 8-ft. pipe cast monolithically on curves, and 974 ft. of 11-ft. x 16-ft. inverted egg pipe cast monolithically.

Like Louisville, hundreds of cities depend on concrete pipe sewers. These systems have demonstrated concrete pipe's rugged durability, great strength, maximum hydraulic capacity, minimum infiltration and leakage and unusual resistance to abrasion.

Concrete pipe sewers are moderate in first cost, require little maintenance and last for generations. The result is true **low-annual-cost** sewer service. Send for the free 48-page booklet, "Concrete Sewers", distributed only in the United States and in Canada.

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